

Course Outline – Fall 2020

CS 4457A / 9657A: Computer Networks II

1. General Course Information

Course Information

CS 4457A / 9657A: Computer Networks II

Tuesday: 9:30am – 12:30pm, ONLINE (pre-recorded lectures will be available on OWL)

Prerequisites

Computer Science 3305A/B, Computer Science 3357A/B

Although this course is primarily designed for the senior year undergrad and graduate students who have a background in computer networks and operating systems (such as 3357A/B, 3305A/B) it also welcomes interested students from other relevant disciplines such as electrical and computer engineering, systems engineering, mathematics, statistics, and Combinatorics & Optimization. If the students do not have a background in the area of communication networks, they are encouraged to discuss their interest with the course instructor to evaluate their eligibility for this course.

2. Instructor

Name – Dr. Anwar Haque

Office Location – Middlesex College: MC 415

Phone Number – 519-661-2111 Ext. 87428

E-Mail – ahaque32@uwo.ca

Office Hours (Instructor): Tuesday 10am – 11am (Zoom link and instructions will be provided)

Office hours (Teaching Assistants- TAs): To be announced on OWL and the course website.

3. Course Description

The Internet and other modern communications services provided by telco companies (e.g., Bell Canada, Telus, Rogers) are part of today's modern society. Today's Telco industry serves as a technological backbone for any digital services, and smart infrastructure one could imagine, e.g., content delivery, smart cities, e-health.

This course will first introduce the core technical functionalities within a Telco industry, and then deep dive into a number of network performance and resource management topics. The list of these topics may include ISP network architecture, ISP functional domains, Quality of Service (QoS), Quality of Experience (QoE), Information and Network Security, Network Function Virtualization (NFV), Software Defined Networks (SDN), Internet traffic forecast, and Network cost modeling. The course will also introduce network simulation basics and provide a brief training on how to perform empirical analysis for networks using networks simulator such as Mininet (<http://mininet.org/>). While exploring the technical details of these individual domains, the course will also introduce some of the core research challenges in these fields. Students will gain real-life knowledge and experience through discussion, assignments, and various research projects. The learning component for the Undergraduate students will be tested via a number of assignments, quizzes, a midterm, and a final exam. The learning component for the Graduate students will be tested via a number of assignments, quizzes, and a research project. Graduate students will be involved in exploring a real-world, complex Telco research topic and working on a full-fledge research paper that addresses a specific research problem. In addition, this course is expected to assist the graduate students (who yet to identify their thesis topic) in finding an interesting real-world research problem that could be a good fit for their thesis.

Course Schedule: A detailed course schedule will be available on OWL course site the course website <https://www.csd.uwo.ca/courses/CS4457a/>

Course Delivery Mode: The delivery mode of this course will be asynchronous. However, the quizzes and midterm exam will be scheduled during the lecture time assigned for this course.

Important Sessional Dates:

Classes begin: September 9, 2020
Thanksgiving (no class): October 12, 2020
Reading Week: November 2-8, 2020
Classes end: December 9, 2020

4. Course Materials

Suggested Textbook: Following book is recommended for this course:

William Stallings, "Cryptography and Network Security: Principles and Practice", 8th edition, Pearson, 2020, Print ISBN: Print ISBN: 9780135764039, 0135764033

Lecture notes: Lecture notes will be made available on OWL prior to each class.

Course Website: <http://www.csd.uwo.ca/Courses/CS4457a>

Students should check OWL (<https://owl.uwo.ca>) on a regular basis for news and updates. OWL courser site will be the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis.

5. Methods of Evaluation

Undergraduate Students

There are four basic components (Assignments, Quizzes, Midterm, and Final Exam) that will be used to determine UG student's mark in the course:

- Six assignments worth 30% of the overall mark
- Ten quizzes (best eight will be considered) worth 20% of the overall mark
- One midterm exam worth 10% of the overall mark
- A final exam worth 40% of the overall mark

The following rules are designed to ensure that students meet certain minimum standards:

- To be eligible to pass the course, a student must receive at least 40% in the exam components (i.e., 40% of 70) and at least 40% in the assignments (i.e., 40% of 30).
- To be eligible to receive an overall grade of 60% or higher in the course, a student must receive at least 50% in the exam component (i.e., 50% of 70) and at least 50% in the assignments (i.e., 50% of 30).

There is a final exam for the UG students that is scheduled by the Registrar.

Graduate Students

There are three basic components (Assignments, Quizzes, and Research project) and that will be used to determine a graduate student's mark in the course:

- Ten quizzes (best eight will be considered) worth 20% of the overall mark
- Six assignments worth 30% of the overall mark
- A research project proposal worth 10% of the overall mark
- A final research paper worth 40% of the overall mark (35% research paper + 5% presentation)

The following rules are designed to ensure that students meet certain minimum standards:

- To be eligible to pass the course, a student must receive at least 40% in the exam components (i.e., 40% of 20), at least a 40% in the assignments (i.e., 40% of 30), and at least 40% in the research project components (i.e., 40% of 50).
- To be eligible to receive an overall grade of 60% or higher in the course, a student must receive at least 50% in the exam component (i.e., 50% of 20), at least 50% in the assignments (i.e., 50% of 30), and at least 50% in the research project component (i.e., 50% of 50).

A detailed course schedule is available on OWL and the course website: <https://www.csd.uwo.ca/courses/CS4457a/> where a tentative list of topics covered on each test are provided.

Below is the summary of the individual course components (both UG and Grad):

Table 1: Course grade components and weighting

Course Component	Student Group	Description	Grade weight %
Assignments	Undergrad	A total of six assignments. Individual effort. See note #1 below	30%
Assignments	Grad	A total of six assignments. Individual effort. See note #1 below	30%
Quizzes	Undergrad/Grad	A total of ten quizzes (best eight will be considered) (T/F, multiple choices, and short answer.)	20%
Midterm	Undergrad	(T/F, multiple choices, and short answer)	10%
Final Exam	Undergrad	To be administered by Registrar's office	40%
Research Project Proposal	Grad	2-3 pages research project proposal. Group effort. See note #2 below	10%
Final Research Project	Grad	10-15 pages research paper. Group effort. Pls see note #3 below	35% + 5% = 40% (report + presentation)

Notes:

1. Assignment (both UG and Grad) must be submitted through OWL by the deadline specified on OWL and the course website. All assignments are due by midnight (electronically) of the due date. Late assignments may be handed in but with a penalty of 20% a day. Every effort will be made to have assignments marked and handed back within ten business days of the hand-in date, preferably sooner.

2. Grad Research Proposal: Graduate students are expected to write a research proposal to outline their final research papers. This proposal paper could be a 2-3 page that includes (a) the specific research problem that students planning to explore; (b) related work (other research works in this area); (c) scientific importance / significance of the proposed research plan (why this is an important area to explore); and (d) a brief outline of how they plan to approach the problem. Students are required to work in a group (with other graduate students) for their projects.

3. Grad Final Research Project: Based on the research proposal submitted by the graduate students they are expected to work on a full-fledge research paper of 10 to 15 pages in length. This research paper should include (a) the problem statement; (b) relevant work, (c) technical/scientific contribution why the proposed research will be interesting to the scientific community; (d) detailed description of the proposed idea /solution/ framework; (e) validation of the proposed solution through some analysis; and (f) brief discussion on the main contribution of this paper in relevance to major research works done so far.

Guideline on research paper review (Assignments for Grad students), research proposal, final project, and presentations will be discussed in class, and the necessary information will be available on OWL. Graduate students will be allowed to submit their final research paper by December 22, 2020.

Exams

There is a final exam that is scheduled by the Registrar. There is one midterm (Exam Date: TBA). There will be a total of ten quizzes and the best eight will be considered. Owl's *tests and quizzes* will be used for this purpose. A detailed schedule of these tests is available on OWL and on the course website.

Accommodated Evaluations

There will be no makeup for the Quizzes or the Midterm Exam. If you miss the Quiz or the Midterm Exam, follow the procedure for Academic Accommodation detailed in Section 6 below. If accommodation is approved by your Dean's office, your Final Exam mark will be reweighted to include the weight of the Quiz and Midterm Exam.

6. Accommodation and Accessibility

Accommodation Policies

Students with disabilities work with Accessible Education (formerly SSD), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The Academic Accommodation for Students with Disabilities policy can be found at:

[https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf)

Academic Consideration for Student Absence

Students will have up to two (2) opportunities during the regular academic year to use an on-line portal to self-report an absence during the semester, provided the following conditions are met: the absence is no more than 48 hours in duration, and the assessment for which consideration is being sought is worth 30% or less of the student's final grade. Students are expected to contact their instructors within 24 hours of the end of the period of the self-reported absence, unless noted on the syllabus. Students are not able to use the self-reporting option in the following circumstances:

- for exams scheduled by the Office of the Registrar (e.g., December and April exams)
- absence of a duration greater than 48 hours,
- assessments worth more than 30% of the student's final grade,
- if a student has already used the self-reporting portal twice during the academic year

If the conditions for a Self-Reported Absence are *not* met, students will need to provide a Student Medical Certificate if the absence is medical, or provide appropriate documentation if there are compassionate grounds for the absence in question. Students are encouraged to contact their Faculty academic counselling office to obtain more information about the relevant documentation.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For policy on Academic Consideration for Student Absences - Undergraduate Students in First Entry Programs, see:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf

and for the Student Medical Certificate (SMC), see:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Religious Accommodation

Students should consult the University's list of recognized religious holidays, and should give reasonable notice in writing, prior to the holiday, to the Instructor and an Academic Counsellor if their course requirements will be affected by a religious observance. Additional information is given in the Western Multicultural Calendar:

<https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

7. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy, <http://www.uwo.ca/its/identity/activatenonstudent.html>, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

Assignments may be subject to submission for similarity review by MOSS that will check for similarity for detecting plagiarism that may indicate cheating.

Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. Information about the technical requirements are available at the following link:

<https://www.proctortrack.com/tech-requirements/>

8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on add/drop courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Student Accessibility Services (SAS) at (519) 661-2147 if you have any questions regarding accommodations.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>.

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/mental_health) for a complete list of options about how to obtain help.

Additional student-run support services are offered by the USC, <http://westernusc.ca/services>.